



### Product description

- The mic+ sensor with two switching outputs measures the distance to an object within the detection zone contactless. Depending on the adjusted detect distance the switching output is set.
- All settings are done with two push-buttons and a three-digit LED-display (TouchControl).
- Three-colour LEDs indicate the switching status.
- The output functions are changeable from NOC to NCC.
- The sensors are adjustable manually via TouchControl or via Teach-in procedure.
- Useful additional functions are set in the Add-on-menu.
- Using the LinkControl adapter (optional accessory) all TouchControl and additional sensor parameter settings can be adjusted by a Windows® Software.

### Operating Manual

#### mic+ Ultrasonic Sensors with two switching outputs

mic+25/DD/TC	mic+25/EE/TC
mic+35/DD/TC	mic+35/EE/TC
mic+130/DD/TC	mic+130/EE/TC
mic+340/DD/TC	mic+340/EE/TC
mic+600/DD/TC	mic+600/EE/TC

settings can be adjusted by a Windows® Software.

### Safety Notes

- Read the operating instructions prior to start-up.
- Connection, installation and adjustment works may only be carried out by expert personnel.
- No safety component in accordance with the EU Machine Directive, use in the area of personal and machine protection not permitted

### Proper Use

mic+ ultrasonic sensors are used for non-contact detection of objects.

The mic+ sensors have a **blind zone** in which distance measurement is not possible. The **operating range** indicates the distance of the sensor that

can be applied with normal reflectors with sufficient function reserve. When using good reflectors, such as a calm water surface, the sensor can also be used up to its **maximum range**. Objects that strongly absorb (e.g. plastic foam) or diffusely reflect sound (e.g. pebble stones) can also reduce the defined operating range.

### Synchronisation

If the assembly distances shown in Fig. 1 for two or more sensors are exceeded the integrated synchronisation should be used. Connect Sync/Com-channels (pin 5 at the units receptacle) of all sensors (10 maximum).

mic+25...	≥0.35 m	≥2.50 m
mic+35...	≥0.40 m	≥2.50 m
mic+130...	≥1.10 m	≥8.00 m
mic+340...	≥2.00 m	≥18.00 m
mic+600...	≥4.00 m	≥30.00 m

Fig. 1: Assembly distances, indicating synchronisation/multiplex

### Multiplex mode

The Add-on-menu allows to assign an individual address »01« to »10« to each sensor connected via the Sync/Com-channel (Pin5). The sensors perform the ultrasonic measurement sequentially from low to high address. Therefore any influence between the sensors is rejected. The address »00« is reserved to synchronisation mode and deactivates the multiplex mode. To use synchronised mode all sensors must be set to address »00«.

### Installation

- Assemble the sensor at the installation location.
- Plug in the connector cable to the M12 connector, see Fig. 2.

		<b>colour</b>
1	+U <sub>B</sub>	brown
3	-U <sub>B</sub>	blue
4	D2	black
2	D1	white
5	Sync/Com	grey

Fig. 2: Pin assignment with view onto sensor plug and colour coding of the microsonic connection cable

### Start-up

- Connect the power supply.
- Set the parameters of the sensor manually via TouchControl (see Fig. 3 and Diagram 1)
- or use the Teach-in procedure to adjust the detect points (see Diagram 2).

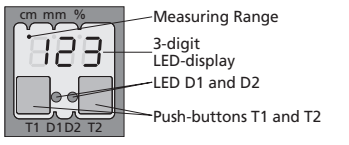


Fig. 3: TouchControlLED display

### Factory setting

mic+ sensors are delivered factory made with the following settings:

- Switching outputs on NOC
- Detecting distance at operating range and half operating range
- Measurement range set to maximum range

### Maintenance

mic+ sensors work maintenance free. Small amounts of dirt on the surface do not influence function. Thick layers of dirt and caked-on dirt affect sensor function and therefore must be removed.

### Notes

- mic+ sensors have internal temperature compensation. Because the sensors heat up on their own, the temperature compensation reaches its optimum working point after approx. 30 minutes of operation.
- During normal operating mode, a yellow LED signals that the switching output has connected.
- During normal operating mode, the measured distance value is displayed on the LED-indicator in mm (up to 999 mm) or cm (from 100 cm). Scale switches automatically and is indicated by a point on top of the digits.
- During Teach-in mode, the hysteresis loops are set back to factory settings.
- If no objects are placed within the detection zone the LED-indicator shows »--«.
- If no push-buttons are pressed for 20 seconds during parameter setting mode the made changes are stored and the sensor returns to normal operating mode.

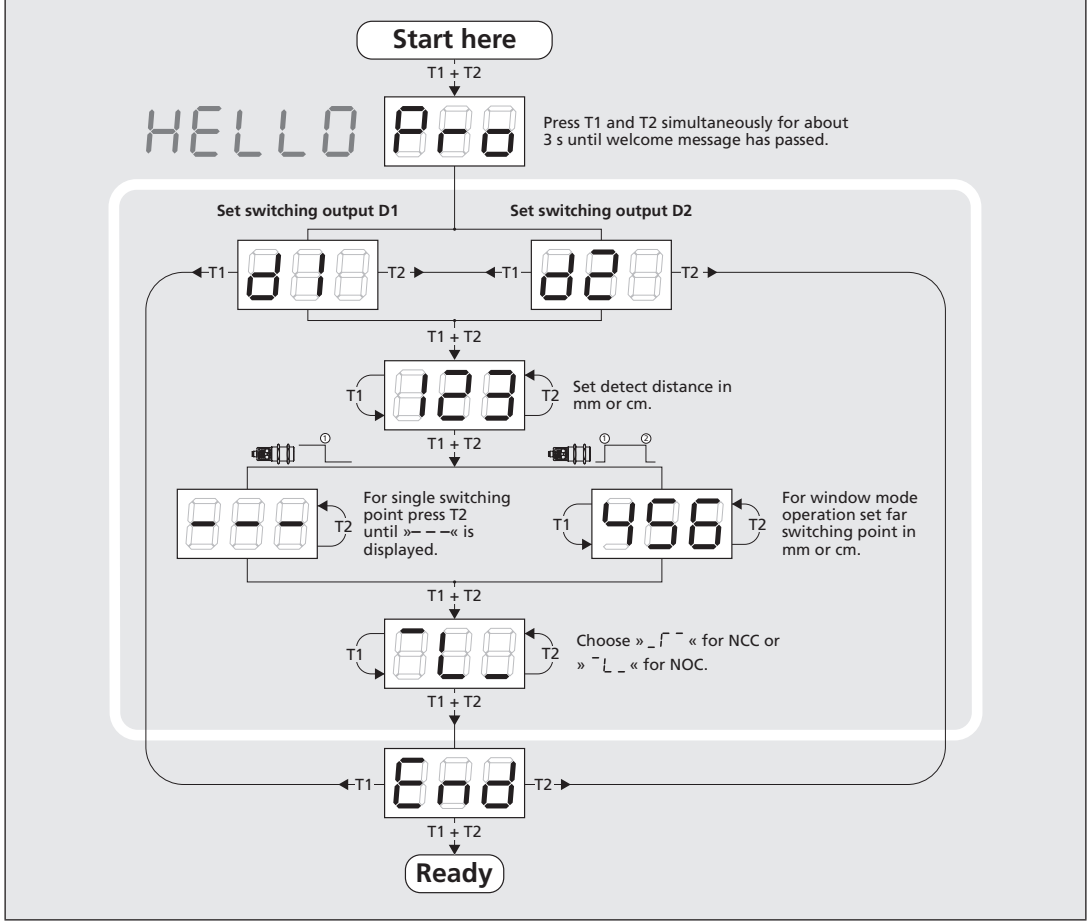
- The sensor can be reset to its factory setting, see »Key lock and factory setting«, Diagram 3.

### Show parameters

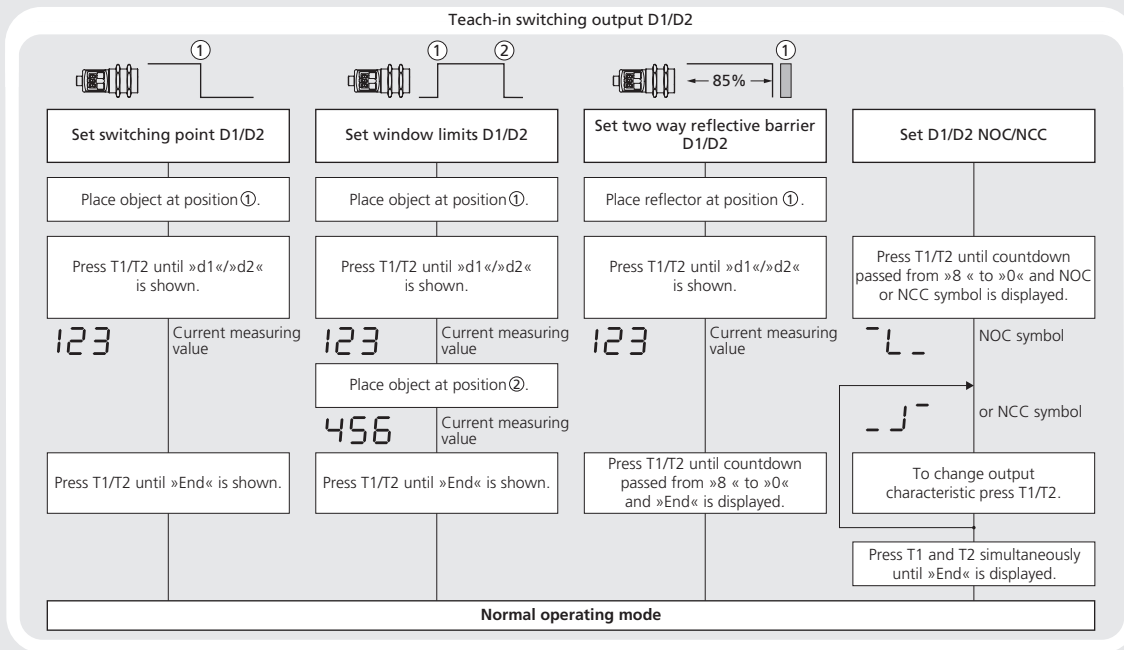
- In normal operating mode shortly push T1. The LED display shows »PAR.«

Each time you tap push-button T1 the actual settings of the analogue output are shown.

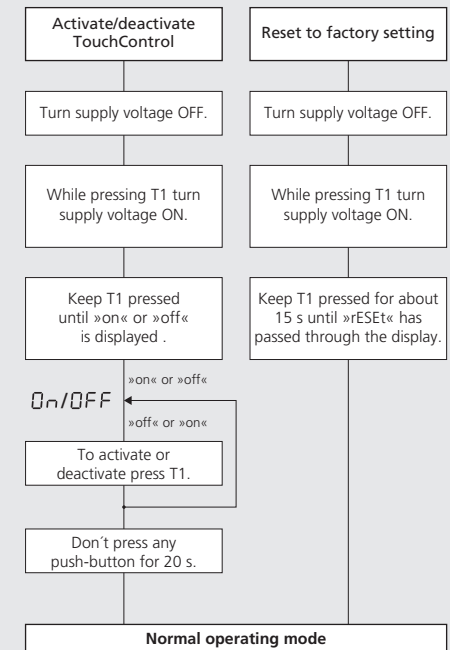
Diagram 1: Set sensor parameters numerically using LED display



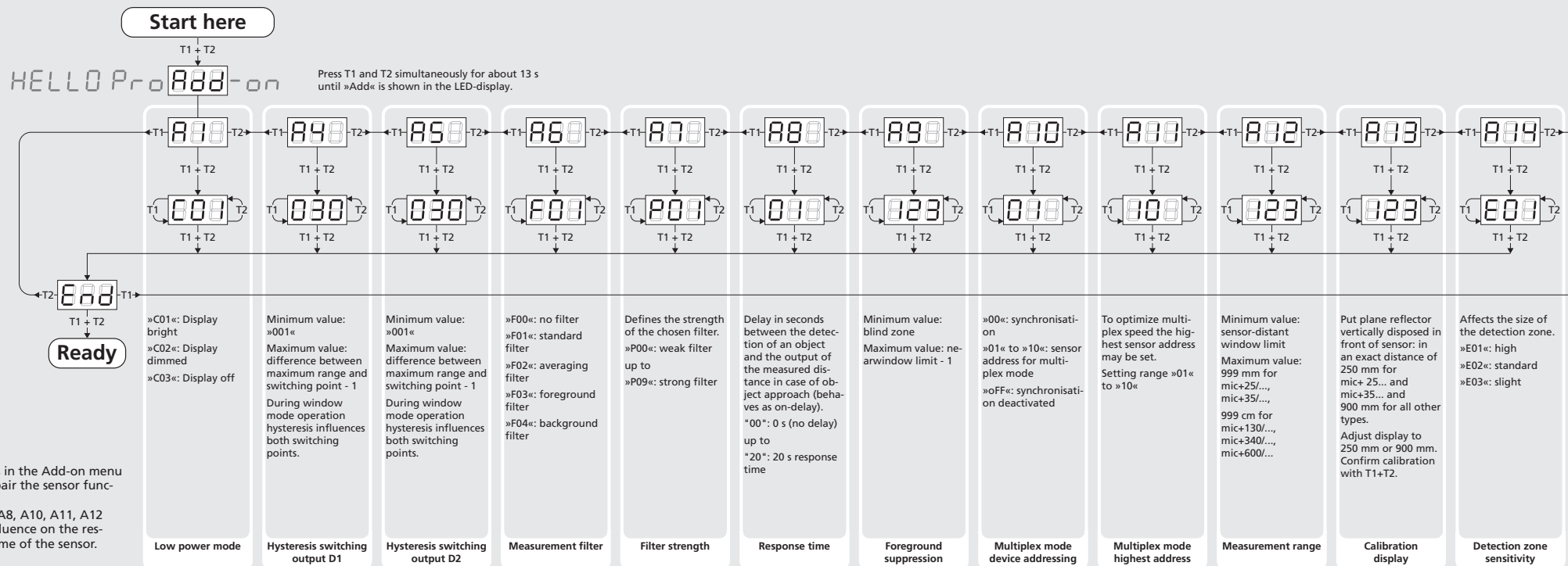
**Diagram 2: Set sensor parameters via Teach-in procedure**



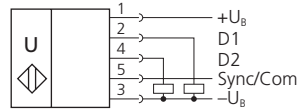
**Diagram 3: Key lock and factory setting**



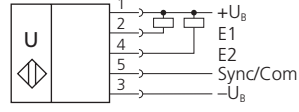
**Diagram 4: Useful additional functions in Add-on menu (for experienced users only, settings not required for standard applications)**



**Technical data**

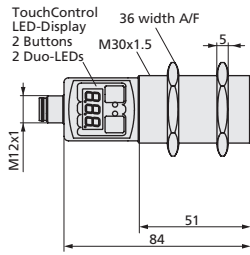


2 pnp switching outputs

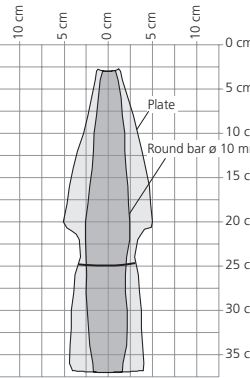


2 npn switching outputs

**mic+25...**



blind zone 0 to 30 mm  
 operating range 250 mm  
 maximum range 350 mm  
 angle of beam spread see detection zone  
 transducer frequency 320 kHz  
 resolution 0.025 mm



reproducibility ±0.15 %  
 accuracy ±1 % (Temperature drift internal compensated, may be deactivated<sup>3)</sup>, 0.17%/K without compensation)  
 operating voltage  $U_B$  9 to 30 V DC, short-circuit-proof, Class 2  
 voltage ripple ±10 %  
 no-load supply current ≤ 80 mA

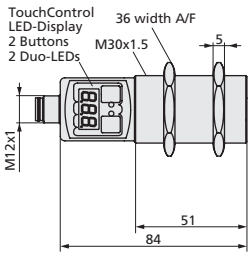
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
 class of protection to EN 60529 IP 67  
 norm conformity EN 60947-5-2  
 type of connection 5-pin initiator plug, PBT  
 controls 2 push-buttons (TouchControl)  
 indicators 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl  
 programmable with TouchControl and LinkControl

operating temperature -25 to +70 °C  
 storage temperature -40 to +85 °C  
 weight 150 g  
 switching hysteresis<sup>1)</sup> 3 mm  
 switching frequency<sup>2)</sup> 25 Hz  
 response time<sup>2)</sup> 32 ms  
 time delay before availability <300 ms

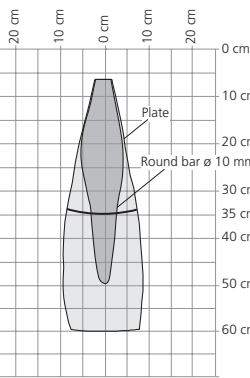
order No. **mic+25/DD/TC**  
 switching output 2 x pnp,  $U_B - 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

order No. **mic+25/EE/TC**  
 switching output 2 x npn,  $-U_B + 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

**mic+35...**



blind zone 0 to 65 mm  
 operating range 350 mm  
 maximum range 600 mm  
 angle of beam spread see detection zone  
 transducer frequency 400 kHz  
 resolution 0.025 mm



reproducibility ±0.15 %  
 accuracy ±1 % (Temperature drift internal compensated, may be deactivated<sup>3)</sup>, 0.17%/K without compensation)  
 operating voltage  $U_B$  9 to 30 V DC, short-circuit-proof, Class 2  
 voltage ripple ±10 %  
 no-load supply current ≤ 80 mA

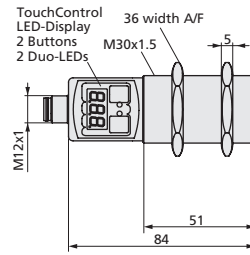
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
 class of protection to EN 60529 IP 67  
 norm conformity EN 60947-5-2  
 type of connection 5-pin initiator plug, PBT  
 controls 2 push-buttons (TouchControl)  
 indicators 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl  
 programmable with TouchControl and LinkControl

operating temperature -25 to +70 °C  
 storage temperature -40 to +85 °C  
 weight 150 g  
 switching hysteresis<sup>1)</sup> 5 mm  
 switching frequency<sup>2)</sup> 12 Hz  
 response time<sup>2)</sup> 64 ms  
 time delay before availability <300 ms

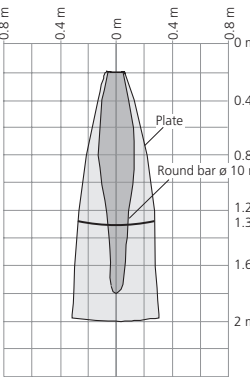
order No. **mic+35/DD/TC**  
 switching output 2 x pnp,  $U_B - 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

order No. **mic+35/EE/TC**  
 switching output 2 x npn,  $-U_B + 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

**mic+130...**



blind zone 0 to 200 mm  
 operating range 1,300 mm  
 maximum range 2,000 mm  
 angle of beam spread see detection zone  
 transducer frequency 200 kHz  
 resolution 0.18 mm



reproducibility ±0.15 %  
 accuracy ±1 % (Temperature drift internal compensated, may be deactivated<sup>3)</sup>, 0.17%/K without compensation)  
 operating voltage  $U_B$  9 to 30 V DC, short-circuit-proof, Class 2  
 voltage ripple ±10 %  
 no-load supply current ≤ 80 mA

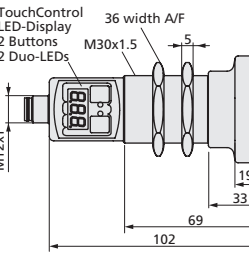
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
 class of protection to EN 60529 IP 67  
 norm conformity EN 60947-5-2  
 type of connection 5-pin initiator plug, PBT  
 controls 2 push-buttons (TouchControl)  
 indicators 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl  
 programmable with TouchControl and LinkControl

operating temperature -25 to +70 °C  
 storage temperature -40 to +85 °C  
 weight 150 g  
 switching hysteresis<sup>1)</sup> 20 mm  
 switching frequency<sup>2)</sup> 8 Hz  
 response time<sup>2)</sup> 92 ms  
 time delay before availability <300 ms

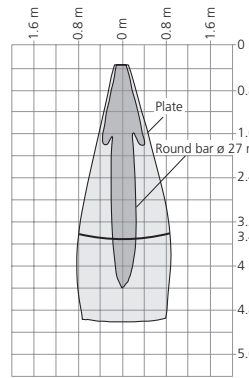
order No. **mic+130/DD/TC**  
 switching output 2 x pnp,  $U_B - 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

order No. **mic+130/EE/TC**  
 switching output 2 x npn,  $-U_B + 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

**mic+340...**



blind zone 0 to 350 mm  
 operating range 3,400 mm  
 maximum range 5,000 mm  
 angle of beam spread see detection zone  
 transducer frequency 120 kHz  
 resolution 0.18 mm



reproducibility ±0.15 %  
 accuracy ±1 % (Temperature drift internal compensated, may be deactivated<sup>3)</sup>, 0.17%/K without compensation)  
 operating voltage  $U_B$  9 to 30 V DC, short-circuit-proof, Class 2  
 voltage ripple ±10 %  
 no-load supply current ≤ 80 mA

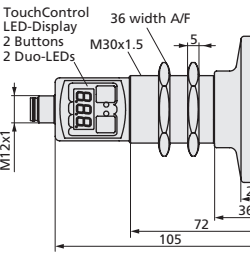
housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
 class of protection to EN 60529 IP 67  
 norm conformity EN 60947-5-2  
 type of connection 5-pin initiator plug, PBT  
 controls 2 push-buttons (TouchControl)  
 indicators 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl  
 programmable with TouchControl and LinkControl

operating temperature -25 to +70 °C  
 storage temperature -40 to +85 °C  
 weight 210 g  
 switching hysteresis<sup>1)</sup> 50 mm  
 switching frequency<sup>2)</sup> 4 Hz  
 response time<sup>2)</sup> 172 ms  
 time delay before availability <380 ms

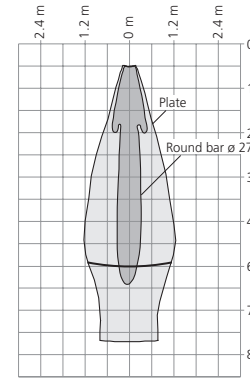
order No. **mic+340/DD/TC**  
 switching output 2 x pnp,  $U_B - 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

order No. **mic+340/EE/TC**  
 switching output 2 x npn,  $-U_B + 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

**mic+600...**



blind zone 0 to 600 mm  
 operating range 6,000 mm  
 maximum range 8,000 mm  
 angle of beam spread see detection zone  
 transducer frequency 80 kHz  
 resolution 0.18 mm



reproducibility ±0.15 %  
 accuracy ±1 % (Temperature drift internal compensated, may be deactivated<sup>3)</sup>, 0.17%/K without compensation)  
 operating voltage  $U_B$  9 to 30 V DC, short-circuit-proof, Class 2  
 voltage ripple ±10 %  
 no-load supply current ≤ 80 mA

housing Brass sleeve, nickel-plated, plastic parts: PBT, TPU; Ultrasonic transducer: polyurethane foam, epoxy resin with glass content  
 class of protection to EN 60529 IP 67  
 norm conformity EN 60947-5-2  
 type of connection 5-pin initiator plug, PBT  
 controls 2 push-buttons (TouchControl)  
 indicators 3-digit LED display, 2 three-colour LEDs with TouchControl and LinkControl  
 programmable with TouchControl and LinkControl

operating temperature -25 to +70 °C  
 storage temperature -40 to +85 °C  
 weight 270 g  
 switching hysteresis<sup>1)</sup> 100 mm  
 switching frequency<sup>2)</sup> 3 Hz  
 response time<sup>2)</sup> 240 ms  
 time delay before availability <450 ms

order No. **mic+600/DD/TC**  
 switching output 2 x pnp,  $U_B - 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

order No. **mic+600/EE/TC**  
 switching output 2 x npn,  $-U_B + 2 V$ ,  $I_{max} = 2 \times 200 \text{ mA}$   
 switchable NOC/NCC, short-circuit-proof

<sup>1)</sup> Can be programmed via TouchControl and LinkControl.  
<sup>2)</sup> With TouchControl and LinkControl, the selected filter setting and the maximum range influence the switching frequency and the response time.  
<sup>3)</sup> Can be deactivated via LinkControl.



Enclosure Type 1  
 For use only in industrial machinery NFPA 79 applications.

The proximity switches shall be used with a Listed (CYI/VT) cable/connector assembly rated minimum 32 Vdc, minimum 290 mA, in the final installation.



Registration no. 75330-19  
 Approved on June 25th, 2019

